

CLAIMS

- 1 1. A method for managing data volumes from a management terminal in a
2 distributed computer system having a host computer system with at least one
3 storage device connected to the computer system by driver software, the method
4 comprising:
 - 5 (a) inserting an interface layer between the driver software and the storage
6 device, the interface layer exporting a platform dependent API and
7 controlling data passing between the driver software and the storage
8 device;
 - 9 (b) running, in the host, management facade software that converts the
10 interface layer API to platform-independent method calls;
 - 11 (c) running, in the host, a federated bean that discovers data volumes in the
12 storage device and generates method calls to the management facade to
13 control the interface layer; and
 - 14 (d) controlling the federated bean to display and configure the data volumes.
- 1 2. The method of claim 1 wherein step (d) comprises controlling the federated bean
2 with a command line interface.
- 1 3. The method of claim 1 wherein step (d) comprises controlling the federated bean
2 with a graphical user interface.
- 1 4. The method of claim 1 wherein step (a) comprises inserting a SCSI terminal
2 emulation interface layer between the driver software and the storage device,
3 which interface layer makes the storage device appear as a SCSI device.
- 1 5. The method of claim 1 wherein step (a) comprises inserting a storage volume
2 interface layer between the driver software and the storage device, inserting an

3 additional data service interface layer between the storage volume interface layer
4 and the storage device and using the storage volume interface layer to divert
5 information passing between the driver software and the storage device to the
6 additional data service layer.

1 6. The method of claim 1 wherein step (c) comprises:
2 (c1) displaying all data volumes on the host with information regarding the data
3 volumes displayed in a uniform manner.

1 7. The method of claim 6 wherein the data volumes on the host have various
2 volume types and step (c1) comprises displaying all data volumes of each
3 volume type together wherein information regarding each data volume type is
4 presented in a uniform manner.

1 8. The method of claim 1 further comprising:
2 (e) running a distributed management framework in the computer system, the
3 distributed management framework having a lookup service; and
4 (f) using the lookup service to locate the federated bean.

1 9. The method of claim 1 wherein the federated bean maintains a list of users for
2 each of the data volumes and the method further comprises:

3 (g) registering each user of one of the data volumes with the federated bean
4 when the each user requests use of the one data volume; and
5 (h) upon registration, entering the data volume user into a list maintained for
6 the one data volume.

1 10. The method of claim 1 further comprising:
2 (i) retrieving a list of users for a specific volume from the federated bean; and

3 (j) contacting each user on the list to determine how the each user is using
4 the specific volume.

1 11. The method of claim 10 wherein each user has a method describing how the
2 each user is using the specific volume and wherein step (j) comprises contacting
3 each user on the list and running the method in the each user.

1 12. Apparatus for managing data volumes from a management terminal in a
2 distributed computer system having a host computer system with at least one
3 storage device connected to the computer system by driver software, the
4 apparatus comprising:

5 an interface layer that is inserted between the driver software and the
6 storage device, the interface layer exporting a platform dependent API and
7 controlling data passing between the driver software and the storage device;
8 management facade software in the host that converts the interface layer
9 API to platform-independent method calls;

10 a federated bean in the host that discovers data volumes in the storage
11 device and generates method calls to the management facade to control the
12 interface layer; and

13 a presentation program that controls the federated bean to display and
14 configure the data volumes.

1 13. The apparatus of claim 12 wherein the presentation program comprises a
2 command line interface.

1 14. The apparatus of claim 12 wherein the presentation program comprises a
2 graphical user interface.

- 1 15. The apparatus of claim 12 wherein the interface layer comprises a SCSI terminal
2 emulation interface layer that makes the storage device appear as a SCSI
3 device.
- 1 16. The apparatus of claim 12 wherein the interface layer comprises:
2 a storage volume interface layer located between the driver software and
3 the storage device; and
4 an additional data service interface layer located between the storage
5 volume interface layer and the storage device and wherein the storage volume
6 interface layer is used to divert information passing between the driver software
7 and the storage device to the additional data service layer.
- 1 17. The apparatus of claim 12 wherein the federated bean comprises a logical disk
2 aggregator that retrieves information from all data volumes on the host.
- 1 18. The apparatus of claim 17 wherein the data volumes on the host have various
2 volume types and the logical disk aggregator comprises mechanisms that
3 retrieve information from each volume type.
- 1 19. The apparatus of claim 12 wherein the computer system has a distributed
2 management framework with a lookup service running therein; and the apparatus
3 further comprises a mechanism in the lookup service that locates the federated
4 bean.
- 1 20. The apparatus of claim 12 wherein the federated bean comprises a list of users
2 for each of the data volumes and a mechanism for registering each user of one
3 of the data volumes with the federated bean when the each user requests use of
4 the one data volume by entering the data volume user into a list maintained for
5 the one data volume.

1 21. The apparatus of claim 12 wherein the federated bean further comprises a
2 mechanism that retrieves a list of users for a specific volume from the federated
3 bean and a mechanism that contacts each user on the list to determine how the
4 each user is using the specific volume.

1 22. The apparatus of claim 21 wherein each user has a method describing how the
2 each user is using the specific volume and wherein the mechanism that contacts
3 each user comprises a mechanism for calling the method in the each user.

1 23. A computer program product for managing data volumes from a management
2 terminal in a distributed computer system having a host computer system with at
3 least one storage device connected to the computer system by driver software,
4 the computer program product comprising a computer usable medium having
5 computer readable program code thereon, including:
6

7 interface layer program code for insertion between the driver software and
8 the storage device, the interface layer program code exporting a platform
9 dependent API and controlling data passing between the driver software and the
10 storage device;

11 management facade software that converts the interface layer API to
12 platform-independent method calls;

13 federated bean program code that discovers data volumes in the storage
14 device and generates method calls to the management facade to control the
15 interface layer; and

16 a presentation program that controls the federated bean to display and
configure the data volumes.

1 24. The computer program product of claim 23 wherein the presentation program
2 comprises a command line interface.

1 25. The computer program product of claim 23 wherein the presentation program
2 comprises a graphical user interface.

1 26. A computer data signal embodied in a carrier wave for managing data volumes
2 from a management terminal in a distributed computer system having a host
3 computer system with at least one storage device connected to the computer
4 system by driver software, the computer data signal comprising:

5 interface layer program code for insertion between the driver software and
6 the storage device, the interface layer program code exporting a platform
7 dependent API and controlling data passing between the driver software and the
8 storage device;

9 management facade software that converts the interface layer API to
10 platform-independent method calls;

11 federated bean program code that discovers data volumes in the storage
12 device and generates method calls to the management facade to control the
13 interface layer; and

14 a presentation program that controls the federated bean to display and
15 configure the data volumes.